2022 Distinguished Lecture Series

Part of the Distinguished Women in Math Lecture Series, organized by the Women in Math(WIM) group

Emily Riehl

JOHNS HOPKINS UNIVERSITY

Research Area: Homotopy theory and homotopy type theory

Contractibility as uniqueness

Tuesday, May 17th, 2022 3:00 pm

What does it mean for something to exist uniquely? Classically, to say that a set A has a unique element means that there is an element x of A and any other element y of A equals x. When this assertion is applied to a space A, instead of a mere set, and interpreted in a continuous fashion, it encodes the statement that the space is contractible, i.e., that A is continuously deformable to a point. This talk will explore this notion of contractibility as uniqueness and its role in generalizing from ordinary categories to infinite-dimensional categories.

Path induction and the indiscernibility of identicals

Wednesday, May 18th, 2022 3:00 pm

Mathematics students learn a powerful technique for proving theorems about an arbitrary natural number: the principle of mathematical induction. This talk introduces a closely related proof technique called "path induction," which can be thought of as an expression of Leibniz's "indiscernibility of identicals": if x and y are identified, then they must have the same properties, and conversely.

Arrow induction and the dependent Yoneda lemma

Thursday, May 19th, 2022 3:00 pm

Arguably the least straightforward theorem of 1-category theory to extend to ∞-categories is the Yoneda lemma. The aim of this talk will be to present a few new perspectives on this result that can be used both to generalize its statement and provide a model-independent proof.